REMARKS/ARGUMENTS

Reconsideration of the present application, as amended, is respectfully requested.

The February 27, 2007 Final Office Action and the Examiner's comments have been carefully considered. In response, claims are amended and remarks are set forth below in a sincere effort to place the present application in form for allowance. The amendments are supported by the application as originally filed. Therefore, no new matter is added.

Inasmuch the present Amendment raises no new issues for consideration, and, in any event, places the present application in condition for allowance or in better condition for consideration on appeal, its entry under the provisions of 37 CFR 1.116 are respectfully requested.

PRIOR ART REJECTIONS

In the Office Action claims 1-3, 5-27 and 29-48 are rejected under 35 USC 102(b) as being anticipated by USP 5,835,953 (Ohran). Claims 4 and 28 are rejected under 35 USC 103(a) as being unpatentable over Ohran in view of U.S. Patent Publication No. 2002/0156971 (Jones). In response, claims are amended and remarks are set forth below in a sincere effort to point out patentable features of the present invention.

Amended claims 1 and 26 more clearly define differences between the backup mechanism taught by Ohran for tracking and mapping "new data," and the present claimed invention, which saves the updates to be entered to the data object in separate successive auxiliary files.

According to the amended claims 1 and 26, there is successively created a "local auxiliary volume in the local storage device to which updates addressed to the frozen selected data object are redirected," without the need to operate a tracking mechanism to trail each write operation addressed to the data object, as taught by Ohran, at column 5, lines 39-57.

Ohran clearly teaches at column 5, lines 48-49, that the "invention tracks the changes made to the primary mass storage device." Furthermore, at column 5, lines 49-53, Ohran explains that "tracking is done by identifying those storage locations on the primary mass storage device that have new data written in them from the time that the backup storage device was in sync with the primary mass storage device," which mechanism is needed, as at column 5 lines 53-57, to identify "those changes that need to be made to the backup storage device in order to bring the backup storage device current with the primary mass storage device."

Ohran thus operates a tracking mechanism that requires both computing resources and time of operation for completion. In

contrast to Ohran, the present claimed invention differentiates updates addressed to the data object simply by saving those updates in separate auxiliary volumes, without being dependent on any system state condition, or on any computation procedure, both being time dependent and time consuming.

At column 10, lines 55-64, Ohran presents details about the tacking mechanism involved in the updating of the data object to be backed-up.

According to Ohran, in one case there is a need for "keeping a map which identifies those storage locations that have new data written in them starting with time T.sub.0." and in the other case, for "a list of the storage locations that have new data written in them beginning at time T.sub.0" to be kept.

In addition to the imposition of a tracking mechanism for the operation of Ohran's backup system, as described above, there is one more limitation, namely that Ohran's backup is operable only in "logically consistent states," as stated at column 5, lines 20-38.

Although being presented as an advantage, Ohran's system needs to wait until a requested condition is met before being able to back-up since one must make sure that "the primary storage device is in a logically consistent state when a backup is made."

Another drawback of Ohran's invention is that yet another mechanism is required to detect a "logically consistent state," as stated at column 6, lines 5-18.

Evidently, Ohran's mechanism for the identification of a logically consistent state is one more mechanism requiring the allocation of computing resources and presenting a waste of time. At column 15, lines 8-35, Oran provides details about the mechanisms for the identification of a logically consistent state.

In contrast to Ohran, the present claimed invention is not limited to any prerequisite condition for mirroring from local storage to remote storage.

In view of the foregoing, claims 1 and 25 are patentable over the cited reference under 35 USC 102 as well as 35 USC 103.

None of the other references of record close the gap between the present claimed invention as defined by claims 1 and 25 and Ohran. Therefore, claims 1 and 25 are patentable over all of the references of record under 35 USC 102 as well as 35 USC 103.

Amended claims 2 and 26 more clearly define the differences between the succession of backups-on-condition as taught by Ohran, and the unrestricted timing of successive freeze operations of respective successive auxiliary files as with the present claimed invention.

As stated hereinabove, to backup Ohran is compelled to run a first mechanism for identifying and tracking "the changes made to the primary mass storage device," and is able to backup only after "ensuring that the primary storage device is in a logically consistent state when a backup is made." Therefore, a limitation on the frequency of successive backup procedures is inherent with Ohran's invention, which "logically consistent state" limitations are inexistent with the present claimed application. This means for example that with the present claimed application successive freezes may be set to occur at a any desired predetermined discrete time frequency, whereas with Ohran successive backups may occur only and solely when a "logically consistent state" is reached. Thus with Ohran a backup command is not applicable when desired, but only when a "logically consistent state" condition is met, thereby preventing backup by default at any desired point in time.

The limitations stipulated by Ohran are necessary for backup systems, for example when there is need to restore data. Should inconsistent files reside in the backup, then at the time a restoration is requested, those inconsistent files will corrupt the current files residing in the primary system. This may happen even if the files in the primary system reside in a logical consistent version.

To emphasize the contrast with Ohran, for a mirroring functionality such as that of the present claimed invention, the

mirrored data at the remote site are allowed to contain logical inconsistencies, which is different from Ohran. With the present claimed invention there is no need for logical consistency as a prerequisite for mirroring or for restoration, since the recovery may be achieved by simply mirroring the data contained in the remote storage device to the local storage device. Should logical inconsistencies be present at recovery time, these inconsistencies could be treated in the same manner as a file system recovery process would treat a sudden lack of power when in the middle of operations.

With the present claimed application, and in contrast with Ohran, the updates to the data object are kept separate from previous data in local auxiliary volumes and in remote volumes. Each auxiliary volume and its corresponding remote volume are inherently related to a point in time starting with one freeze procedure and ending with the next freeze operation. Ohran differs by writing "new data" into the primary system and saving the "old data" in the mass storage as a copy taken by snapshot, as recited in column 9, lines 14-40.

Ohran takes a snapshot of data, makes a copy of the snapshot for storage into a snapshot storage device, and finally transfers copies of the snapshot from the snapshot storage device into a backup storage device. Ohran does not disclose, teach or suggest any procedure to separately save the "new data" entered to the data object respectively to the point in time of a snapshot, but

specifically stores "new data" with the primary storage and therefore needs to track the changes "by identifying storage locations of the mass storage device that have new data written in them," as stated at column 10, lines 55-64.

With the present claimed invention each auxiliary volume contains exactly and only the write updates entered from one point in time to a next point in time, thus from one freeze to the next freeze. To mirror, or to backup, it suffices to copy an auxiliary volume to a remote volume "as is". With Ohran, the "new data" or updates are written to the primary mass storage and added to the "old data". The "new data" has to be identified, then retrieved, and finally copied to backup, according to column 11, lines 21-37.

Thus, first the "map or other mechanism" containing the addresses of the "new data" is accessed, second the addresses are located and accessed, third the "new data" is fetched from those addresses, and fourth, the "new data" is transferred to the backup storage device. This map related procedure consumes both computing resources and time, which has an impact on both the performance of the backup and the complexity of the software used for the completion of the backup operation. Evidently, it is simpler, faster, and more efficient to just copy an auxiliary volume as with the present claimed invention.

The dissimilarity with Ohran may be presented and appreciated by help of an example that emphasizes the potential

capabilities of the present claimed application over the abilities featured by Ohran.

Assuming that a user of the present claimed invention wishes to return to a specific previous point in time, it suffices to delete all the auxiliary volumes that were created after that specific previous point in time, which is an operation that takes seconds, irrelevantly of the amount of data stored in the to be deleted auxiliary volumes. With Ohran however, a massive copy of all the data stored from the moment of the specific previous point in time must be executed, which is a computing resources and time consuming operation.

In view of all of the foregoing, claims 2 and 26 are patentable over Ohran.

None of the other references of record close the gap between the present claimed invention as defined by claims 2 and 26 and Ohran. Therefore, claims 2 and 26 are patentable over all of the references of record under 35 USC 102 as well as 35 USC 103.

Claims 3-24 and 27-48 are either directly or indirectly dependent on claims 1 or 25, and are patentable over the references of record in view of their dependence on claims 1 or 25, and because the references do not disclose, teach or suggest each of the limitations set forth in the dependent claims.

In view of all of the foregoing, claims 1-48 are in form for immediate allowance, which action is earnestly solicited.

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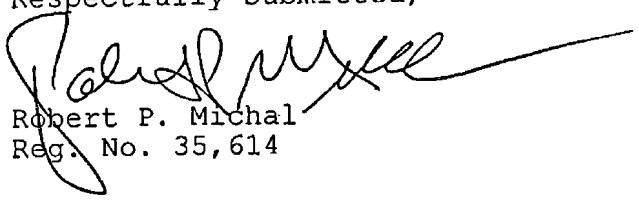
Entry of this Amendment under the provisions of 37 CFR 1.116, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner disagrees with any of the foregoing, the Examiner is respectfully requested to point out where there is support for a contrary view.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,



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